A critical appraisal of "Rehabilitation Treatment of Gait in Patients with Parkinson's Disease with Freezing: A Comparison Between Two Physical Therapy Protocols Using Visual and Auditory Cues with or Without Treadmill Training"

By

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In partial fulfillment of the

requirements for the course:

PT 7240 Evidence-Based Practice in Physical Therapy

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November, 2021

Abstract

Freezing gait is a debilitating issue in many people with Parkinson's disease. While the current methods to manage this issue are helping, this critical analysis wants to look into possible methods to improve the current treatment protocols of freezing gait. This paper analyzes the experimental approach of adding in a treadmill for freezing gait as an unspoken cue to support the visual and auditory cues already given to unfreeze a patient's gait. This paper uses reliable sources, methods, and results to support their hypothesis of using a treadmill as a possible intervention. However, there are some improvements to be made in order to raise the papers credibility. Despite these issues, I believe this is a sound research approach and paper that could be used to support the idea of using treadmills as a new approach to managing freezing gait.

Key words

Parkinson's disease, treadmill training, freezing gait, visual cues, gait.

Introduction

Parkinson's disease is a neurodegenerative disorder that effects thousands of people across the world. There is no cure, and no way completely stop the disease from progressing. While Parkinson's disease causes a variety of motor and neurological abnormalities, this critical appraisal will focus on a research study about a possible intervention to manage freezing gait. Freezing gait in those with Parkinson's Disease can be debilitating and severely effect the quality of life in those with this disease. It is important to assess the validity and possible application of this research study in hopes to reduce and/or manage the effects of freezing gait. The clinical question asked in this appraisal is: For patients with abnormal gait patterns associated with Parkinson's disease, could treadmill training be more effective than traditional approaches in reducing this abnormal gait pattern?

Methods

In order to find a research study to answer our clinical question, the database PubMed central was used. The keywords used to search were Parkinson's and Treadmill, Parkinson's Disease and Gait, Gait and Treadmill. The research studies were limited to peer reviewed to make sure the data was reliable and accurate. The focus for the intervention was treadmill training, which limited the results further. The inclusion criteria were a population of people with Parkinson's disease who had enough mobility to walk on a treadmill (for safety reasons) and freezing gait (condition being tested). The total hits found were around 250 articles before I began reviewing articles. The criteria and specificity used in this literature search helped to narrow down an article for this critical appraisal.

This research article comes from the Movement Disorders Journal and was published in 2009. All of the Authors are Italian doctors, coming from scientific institute departments ranging from

physical therapy to biology. This study was conducted in Italy. All of the sources come from peer reviewed journals, and while some may be older, this could be because they are foundational sources for Parkinson's Disease and the current interventions. I chose this article for a comprehensive critical appraisal because I was initially skeptical of the use of a treadmill in Parkinson's patients with freezing gait. It seemed dangerous and unlikely that putting a moving platform under someone with freezing gait would help more than hurt. I was surprised by the results and know this is something that could easily be implemented in a physical therapy setting without the addition of new machines or tools.

Results

Summary of the study

Parkinson's disease is caused by a lack of dopamine production in the basal ganglia of the brain. This lack of dopamine can cause a range of symptoms, one of the most common being an abnormal gait pattern, such as a freezing gait. In freezing gait, movement therapy has proven to be more effective than medication. Traditional therapy for freezing gait includes auditory and visual cues. This study looks at the effectiveness of adding a treadmill into the therapy program of a patient with freezing gait. The researchers used a randomized group of forty patients with Parkinson's disease and split them into a control therapy and treadmill therapy group. Both groups improved their functional indicators, but the treadmill group had a significantly higher score, especially in the 6-minute walk test. Researchers believe this is because the treadmill acts as an unspoken cue that keeps the patients walking.

Appraisal of the study introduction

The introduction does a good job of explaining the background of Parkinson's disease and takes the time to focus on how freezing gait works. The authors did well shortening their explanation of PD into a concise enough description that the point was made without it being too overwhelming in comparison to the rest of the article.

I would have liked to see more information about the type of treatments already being used to treat freezing gait and how treadmill training would be different than those traditional approaches. The main point of the study was to focus on the effects of the unspoken cue a treadmill provides, yet they barely covered that in the introduction.

Appraisal of the study methods

The strength of this study comes from the design of this study. The groups were randomly allocated, with a control group to assess the impact of the intervention. They used the same researcher to gather all the functional scores so any measurements would be taken in a similar fashion, ruling out possible data inconsistencies that could happen with multiple people taking measurements. The groups have a similar age, medication dosage, and duration of disease, helping rule out and secondary PD symptoms that could affect the results.

There were some significant weaknesses in this study that could be improved to help the credibility of the article. The experimental group was only 40 patients from the same area, so that limits the diversity of the population and possible results. The study does not state whether the researchers or participants were blinded, which could end up skewing the results from researcher bias. A major limit of the study is the ability to replicate the patient population. Parkinson's

disease affects people in many different ways at a range severity so it could be hard to replicate the patient population exactly.

Appraisal of the study results

The result section is written in an organized and clear manner that reflects the same order as the research question and procedures. The hypothesis was addressed and supported by the data collected. The authors included a chart with all the numbers for each groups outcome measures in a way that makes sense and is easy to read. Their results had a significant P value that was related to the hypothesis later in the discussion.

The result section is missing some key information that would have helped support the hypothesis. There is no confidence interval stated for the study. The authors also did not mention a minimal clinically important difference. However, they did provide baseline scores for each group to compare the experimental data to.

Appraisal of the study discussion

The authors did well discussing the findings and how they can apply these results to clinical practice. They explained how this intervention could be implemented in rehab of freezing gait for those with PD and the possible mechanisms behind this improvement. The authors tied their findings into more than four different studies, citing them directly to support their data.

While the discussion was well supported, there are some things missing that could help the credibility of this research. There are no limitations to the study mentioned by the authors. This is a cause for concern because there will always be limitations. Another major limitation not mentioned is the small experimental group size. These two limitations could skew the data due to

the lack of diversity in the population being tested. Furthermore, there are no future studies suggested. This lack of future direction could decrease the quality of this study.

Discussion

Current PT standard practice to manage freezing gait in patients with Parkinson's disease is to use visual and auditory cues to overcome the freezing pattern. The researchers in this study showed a significant enough improvement from an acute trial that long term treadmill therapy with visual and auditory cues could become the standard treatment protocol. This research study supports my clinical question that treadmill training could be more effective than traditional approaches at reducing this abnormal gait pattern. This could change how therapy approaches the treatment of freezing gait and improve outcome measures across the board for these patients. This addition of treadmills in therapy could possible help patients walk further without freezing up and retrain their gait pattern with the unspoken cues provided by the treadmill. It would improve their mobility and overall quality of life. There is a fall risk associated with this treatment and only a certain population with freezing gait would probably feel comfortable getting onto a treadmill. It would take significant confidence in the therapist to prevent any injuries and protect the patient. However, the potential benefits outweigh the risks associated with using a treadmill. Further research should be done to create a functional scale to measure if patients can participate in this intervention. This would allow the patients to work up to the intervention or avoid the risks associated with it if they are not mobile enough to be on the treadmill.

I believe this intervention could be applicated to the direct patient population. The sources, authors, and credibility of the methods give the paper enough reliability that I would feel confident using this intervention with a future patient. I believe this intervention will be

implemented in the coming years, hopefully with a functional scale to avoid any injuries for patients who are not at the skill level needed to be on a treadmill. This intervention would be easy to implement, with most clinics already containing the appropriate equipment to perform this task. Safety may be the most difficult task to address but could be enforced with proper training and confidence of therapists providing the intervention.

While this paper should add in some more measures and improve their methods to combat researcher bias, I believe this paper is credible enough to use in a clinical setting. The researchers created a perfect patient population and make the study easily replicable, adding to its reliability. Future direction should be taken to provide further insight on patient safety and possible ways to work up to the treadmill. This is an incredibly interesting intervention that could change the standard therapeutic approach to managing freezing gait in patients with Parkinson's Disease.